

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
10 October 2002 (10.10.2002)

PCT

(10) International Publication Number  
WO 02/078459 A1

(51) International Patent Classification<sup>7</sup>: A23G 3/30,  
A61K 9/68, 9/00

(84) Designated States (*regional*): European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).

(21) International Application Number: PCT/EP02/03064

(22) International Filing Date: 19 March 2002 (19.03.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
0107954.0 29 March 2001 (29.03.2001) GB

(71) Applicant (*for all designated States except US*): SO-  
CIE TE DES PRODUITS NESTLES S.A. [CH/CH];  
P.O.BOX 353, CH-1800 Vevey (CH).

**Declarations under Rule 4.17:**

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AU, BR, CA, CN, CO, CR, CZ, EC, HU, ID, IL, IN, JP, MX, NZ, PH, PL, RO, RU, SG, SI, SK, TR, UA, ZA, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR)*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designations AU, BR, CA, CN, CO, CR, CZ, EC, HU, ID, IL, IN, JP, MX, NZ, PH, PL, RO, RU, SG, SI, SK, TR, UA, ZA, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR)*
- *of inventorship (Rule 4.17(iv)) for US only*

(72) Inventor; and

(75) Inventor/Applicant (*for US only*): SOLDANI, Cristiana  
[IT/IT]; Viale F. Testi, 210, I-20126 Milano (IT).

(74) Agent: PATE, Fred; Avenue Nestlé 55, CH-1800 Vevey (CH).

**Published:**

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(81) Designated States (*national*): AU, BR, CA, CN, CO, CR, CZ, EC, HU, ID, IL, IN, JP, MX, NZ, PH, PL, RO, RU, SG, SI, SK, TR, UA, US, ZA.

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

WO 02/078459 A1

(54) Title: CHEWING GUM-CONTAINING TABLET

(57) Abstract: A chewing gum-containing tablet comprising a gum base and a tablet base characterised in that, in the mouth, the tablet exhibits a first crumbly stage which changes to a second chewing gum stage.

## CHEWING GUM-CONTAINING TABLET

### FIELD OF THE INVENTION

5 The present invention relates to a chewing gum-containing tablet which has a novel effect in the mouth by combining the properties of a tablet with those of a chewing gum.

### BACKGROUND OF THE INVENTION

10 Ordinary chewing gum contains a generally neutral and essentially tasteless insoluble masticatory gum base which is usually a plasticised rubber or polymer which is softened and has added texturisers, anti-tacking agents and antioxidants, etc. The base is to be chewed rather than eaten in itself and is a vehicle for one or  
15 more non-masticatory active ingredients such as flavours and sweeteners.

EP-A-0 253-040 discloses a chewing gum hard candy confection which softens in the mouth to a chewable mass upon mastication prepared by mixing a melted gum base with a cooked hard candy syrup and cooling to a hard candy matrix. Hard  
20 candy is usually made from a base of a bulk sweetener such as sugar and glucose syrup which normally contain about 95-98% of the product. The hard candy syrup comprising sugar, glucose syrup and water is cooked to a temperature of 127° to 185°C before adding the melted chewing gum base.

25 Tablets are characterised by being hard and somewhat brittle with a smooth surface and differ from hard candy in that they are formed by compressing a tablet base powder in a die where the particles bond together under pressure and the compacted tablet is ejected from the die. The tablet base material is a sugar or a polyol, e.g. sucrose, fructose, dextrose, sorbitol, mannitol, maltitol or  
30 xylitol. Tablets may be chewed in a crumbly state and eventually swallowed.

### SUMMARY OF THE INVENTION

35 The present invention comprises a chewing gum-containing tablet which has a novel and unique effect in the mouth by combining the properties of a tablet with those of a chewing gum. The tablet of the present invention has a hard crumbly

initial eat typical of a pressed sweet like Polo® which changes to a chewing gum stage.

5 Accordingly, the present invention comprises a chewing gum-containing tablet comprising a gum base and a tablet base characterised in that, in the mouth, the tablet exhibits a first crumbly stage which changes to a second chewing gum stage.

#### DETAILED DESCRIPTION OF THE INVENTION

10

The chewing gum-containing tablet according to the invention may be prepared from a gum base and a tablet base material in particulate form.

15 The chewing gum-containing tablet may be prepared by compressing a mixture of the gum base and the tablet base material in powder form. The particle sizes of the gum base and the tablet base may range from 10 microns to 2mm, but the average particle size may be from 20 to 160 microns, preferably from 40 to 120 microns and more preferably from 50 to 100 microns.

20 The gum base may any gum base well known to those skilled in the art and may be a plasticised rubber or polymer which may have added texturisers, anti-tacking agents and antioxidants. A particularly advantageous gum base is ARTICA-T made by Cafosa Gum S/A of Barcelona, Spain. Artica-T is composed of the following classes of materials : specially purified elastomeric polymers, resins,  
25 refined waxes, glycerol esters of edible fatty acids, talc, antioxidant.

The tablet base material may contain sugar or be sugar-free is preferably based on a sugar or a polyol, for example, sucrose, fructose, lactose, dextrose, sorbitol, mannitol, maltitol , xylitol, isomalt, glucose syrup, maltitol syrup or erythritol.

30

Preferably, the gum base is present in an amount of from 5% to 99%, preferably from 10% to 50% and more preferably from 20% to 30% by weight and the tablet base is present in an amount from 1% to 95%, preferably from 50% to 90% and more preferably from 70% to 80% by weight based on the weight of the product.

35

Preferably, the chewing gum-containing tablet may contain a binder, a lubricant, a flavour or a colour.

Optionally, the chewing gum-containing tablet may contain an active ingredient.

5 The active ingredient may be a pharmaceutical, medicated, nutritive or functional ingredient, a dental vehicle such as casein glyco-macro-peptide (CGMP) or a breath freshener. For instance, the active ingredient may be any vitamin, enzyme, amino-acid supplement, protein, gum, carbohydrate, phytochemical, dextrose, lecithin, other trace nutrient, brain-stimulating substance, energy provider, a  
10 mineral, mineral salt, botanical extract, antioxidant, prebiotic, probiotic bacteria, fatty acid, oat beta glucan or other functional fibre, creatine, carnitine, bicarbonate, citrate, or any mixture thereof.

The amount of active ingredient present in the chewing gum-containing tablet may  
15 depend on requirements and the actual ingredient used. For instance, some active ingredients have high functional activity at very-low doses such as vitamins and minerals (micronutrients), whereas others such as dextrose (macronutrients) are beneficial to the body in much higher amounts. Furthermore, plant extracts may only contain small amounts of active constituents within the bulk of the extract  
20 and may therefore need to be added in larger amounts to ensure sufficient effective quantities of the active parts. The amount of active ingredient may, for example, be from up to 0.00000001 to 15% by weight of the chewing gum-containing tablet depending upon the ingredient. The amount of most ingredients is usually less than 1% by weight, and preferably from 0.000001 to 0.5 % by  
25 weight of the chewing gum-containing tablet. CGMP may be used in amounts up to 15%, preferably from 1 to 12% and more preferably from 2.5 to 10% by weight of the chewing gum-containing tablet.

The mineral may be calcium, iron, selenium, zinc, magnesium, phosphorus,  
30 iodine, manganese, iron, boron or copper, molybdenum, potassium, chromium, vanadium or fluoride.

The phytochemical may be a polyphenol, procyanidin or a phenolic acid, catechin or epicatechin, isoflavone, terpene or other phytonutritive plant material.

The botanical extract may be selected from Guarana, Ginkgo Biloba, Kola nut, Goldenseal, Golo Kola, Schizandra, Elderberry, St. John's Wort, Valerian and Ephedra, beta-sitosterol, caffeine, cafestol, D-limonene, kabweol, nomilin, oltipraz, sulphoraphane, tangeretin, black tea, white tea, java tea, folic acid, garlic oil, fiber, green tea extract, lemon oil, mace, licorice, menthol, onion oil, orange oil, rosemary extract, milk thistle extract, Echinacea, Siberian ginseng or Panax ginseng, lemon balm, Kava Kava, matte, bilberry, soy, grapefruit, seaweed, hawthorn, lime blossom, sage, clove, basil, curcumin, taurine, wild oat herb, dandelion, gentian, aloe vera, hops, cinnamon, peppermint, grape, chamomile, fennel, marshmallow, ginger, slippery elm, cardamon, coriander, anise, thyme, rehmannia, eucalyptus, menthol, kava kava, schisandra, withania, cowslip, lycium, passion flower.

The antioxidant substance may be glutathione peroxidase, superoxide dismutase, catalase, co-enzyme Q10 or honey.

The prebiotic may contain fructose, galactose, mannose, soy or inulin.

The probiotic bacteria may be lactobacilli or bifidobacteria, lactococcus, streptococcus, leuconostoccus, pediococcus or enterococcus.

When the chewing gum-containing tablet contains an active ingredient, it may impart to the consumer benefits such as oral care, breath freshness, pharmaceutical or nutritive advantages.

The present invention also provides a process for the preparation of a chewing gum-containing tablet according to claim 1 which comprises mixing a particulated gum base with a particulated tablet base material and compressing the mixture in a tablet press to enable it to bind together and form a firm compact product.

The tablet press comprises a die and a punch and the basic principle of compression applies wherein the die is filled with powder and compressed by the punch being lowered under pressure and maintained on the powder for a period of time known as the dwell time to form the tablet after which the tablet is ejected. Many shapes and sizes of tablet may be made by varying the shape of the die and punch, e.g. circular, briquette, pillow, etc.

In the mouth, the tablet initially has a crumbly texture which lasts for a certain period of time and then becomes a normal cohesive chewing gum. The period of crumbliness varies according to rate of chew and the ratio between the gum and tablet material. For a slow chew according to the recipe this period may vary from 0.5 seconds to 1 minute.

### EXAMPLES

The following Examples further describe the invention by way of illustration only. The gum base used in all the Examples is ARTICA-T made by Cafosa Gum S/A of Barcelona, Spain.

#### Example 1

The following formulation is used to make a large circular chewing gum with a hole in the middle. The gum base and the sorbitol are used in powder form having an average particle size of 40 microns. The flavour is a combination of powder and liquid.

20

Gum Base	21.3%
Sorbitol	72.1%
CGMP	5%
Magnesium stearate	0.5%
Flavour (powder + liquid)	1.1%

25

The above ingredients are filled into the die of a tablet press comprising a suitably shaped die and punch and compressed by the punch being lowered under pressure which is maintained on the powder for a period of time known as the dwell time to bond the particles together and compact them to form the tablet after which the tablet is ejected.

30

In the mouth, the tablet initially has a crumbly texture which lasts for a certain period of time and then becomes a normal cohesive chewing gum.

35

## Example 2

245.95 parts of a Cafosa Gum/Sorbitol premix containing the ingredients in the same proportion as in Example 1 having an average particle size of 40 microns are  
5 mixed with the following ingredients

	Magnesium stearate (lubricant)	1.25 parts
	Mint Oil	1.30 parts
	Mint powder	1.00 parts
10	Menthol Trusil	0.5 parts

The above mixture was compressed as in Example 1 to give a mint-flavoured chewing gum tablet.

15 In the mouth, the tablet initially has a crumbly texture which lasts for a certain period of time and then becomes a normal cohesive chewing gum.

## Example 3

20 240 parts of a Cafosa Gum/Sorbitol premix containing the ingredients in the same proportion as in Example 1 having an average particle size of 40 microns are mixed with the following ingredients

25	Magnesium stearate (lubricant)	1.25 parts
	Peach flavour	5.00 parts
	Malic acid	3.50 parts
	Aspartame	0.25 parts

30 The above mixture was compressed as in Example 1 to give a fruit-flavoured chewing gum tablet.

In the mouth, the tablet initially has a crumbly texture which lasts for a certain period of time and then becomes a normal cohesive chewing gum.

#### Example 4

The following mixture was compressed as in Example 1 to give a flavoured chewing gum tablet.

5

Gum base	26%
Xylitol	28%
Isomalt PF	39.9%
Lycasin	06%
10 Liquid flav. (mint)	0.1%

The above composition of the tablet material gives a crumbliness which lasts for only about 0.5 seconds and then becomes a normal cohesive chewing gum.

15

#### Example 5

The following mixture was compressed as in Example 1 to give a flavoured chewing gum tablet.

20

Gum base	26%
Sugar	74%
Glucose syrup 42 DE	05.3%
Liq. Flavour (mint)	0.1%

25

The above composition of the tablet material gives a crumbliness which lasts for only about 0.5 seconds and then becomes a normal cohesive chewing gum.

30



## CLAIMS

1. A chewing gum-containing tablet comprising a gum base and a tablet base characterised in that, in the mouth, the tablet exhibits a first crumbly stage which  
5 changes to a second chewing gum stage.
2. A chewing gum-containing tablet according to claim 1 prepared from a gum base and a tablet base material in particulate form.
- 10 3. A chewing gum-containing tablet according to claim 1 prepared by compressing a mixture of a gum base and a tablet base material in powder form.
4. A chewing gum-containing tablet according to claim 2 wherein the gum base is a plasticised rubber or polymer which has added texturisers, anti-tacking agents  
15 and antioxidants.
5. A chewing gum-containing tablet according to claim 2 wherein the tablet base material is a sugar or a polyol.
- 20 6. A chewing gum-containing tablet according to claim 2 wherein the tablet base material is sucrose, fructose, lactose, dextrose, sorbitol, mannitol, maltitol, xylitol, isomalt, glucose syrup, maltitol syrup or erythritol.
7. A chewing gum-containing tablet according to claim 1 containing a binder, a  
25 lubricant, a flavour or a colour.
8. A chewing gum-containing tablet according to claim 1 containing a pharmaceutical, medicated, nutritive or functional ingredient, a dental vehicle or a breath freshener.
- 30 9. A process for the preparation of a chewing gum-containing tablet according to claim 1 which comprises mixing a particulated gum base with a particulated tablet base material and compressing the mixture in a tablet press to enable it to bind together and form a firm compact product.

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP 02/03064

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A23G3/30 A61K9/68 A61K9/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A23G A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 00 56281 A (ATP AVANT GARDE TECHNOLOGIES &) 28 September 2000 (2000-09-28) page 4, line 7 -page 5, line 6; claim 23; examples 1-3	1-9
X	US 4 741 905 A (HUZINEC ROBERT) 3 May 1988 (1988-05-03) cited in the application column 5, line 38-47; claims 1-4, 7-12 column 2, line 41 -column 3, line 38 column 4, line 50-54 column 3, line 67 -column 4, line 19 -/--	1-9

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \* & \* document member of the same patent family

Date of the actual completion of the international search

14 August 2002

Date of mailing of the international search report

28/08/2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax (+31-70) 340-3016

Authorized officer

Heirbaut, M

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 02/03064

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 866 179 A (TESTA EMILIO STEFANO) 2 February 1999 (1999-02-02) column 3, line 49 -column 4, line 46; claims 1-12,23-33; examples 1-4 column 2, line 31-51 ---	1-9
X	US 5 824 291 A (HOWARD HERMAN S) 20 October 1998 (1998-10-20) column 3, line 66 -column 4, line 7; claim 13 column 4, line 45-54 column 5, line 16-50; example 2 ---	1-9
X	US 5 711 961 A (SENECI ALESSANDRO ET AL) 27 January 1998 (1998-01-27) claims 1,8,13-15,24,31,37-39 ---	1-9
X	US 4 753 805 A (CHERUKURI SUBRAMAN R ET AL) 28 June 1988 (1988-06-28) column 4, line 12-21; claims 1-16; examples 3-7 column 6, line 14 -column 7, line 3 ---	1-9
X	US 4 737 366 A (GERGELY GERHARD ET AL) 12 April 1988 (1988-04-12) column 1, line 35-38 column 2, line 23-31 column 3, line 17-30; claims 5,7; examples 1,2 ---	1-9
X	WO 97 21424 A (GLAXO WELLCOME LAB ;BOUAFFRE FREDERIQUE ANNIE NATH (FR); LAFON JEA) 19 June 1997 (1997-06-19) page 3, line 7-21; claims 1-6,9 page 4, line 10,11 page 5, line 10-18 ---	1-9
X	PATENT ABSTRACTS OF JAPAN vol. 1995, no. 06, 31 July 1995 (1995-07-31) & JP 07 067541 A (KORISU KK), 14 March 1995 (1995-03-14) abstract ---	1-9
X	EP 0 399 479 A (GERGELY GERHARD) 28 November 1990 (1990-11-28) page 4, line 48 -page 5, line 13; claims 5,6 ---	1-9
X	EP 0 298 922 A (WARNER LAMBERT CO) 11 January 1989 (1989-01-11) page 4, line 24-40; claims 1-4,6-9,16,20,21 page 5, line 29 -page 6, line 9 ---	1-9
	--- -/--	

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 02/03064

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>EP 0 151 344 A (WARNER LAMBERT CO)  14 August 1985 (1985-08-14)  page 10, line 32 -page 12, line 21; claims  1-4, 12, 19, 20  page 16, line 15-19; examples 3-7</p>	1-9

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 02/03064

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0056281	A	28-09-2000	IT MI990571 A1 AU 6203799 A BR 9917220 A CN 1348359 T WO 0056281 A1 EP 1162946 A1	22-09-2000 09-10-2000 26-12-2001 08-05-2002 28-09-2000 19-12-2001
US 4741905	A	03-05-1988	AU 577483 B2 AU 6609486 A EP 0253040 A2 JP 1046098 B JP 1565622 C JP 63003758 A PT 83935 A ,B ZA 8609102 A	22-09-1988 24-12-1987 20-01-1988 05-10-1989 25-06-1990 08-01-1988 01-01-1987 29-07-1987
US 5866179	A	02-02-1999	AT 200024 T CA 2196150 A1 DE 69704426 D1 DE 69704426 T2 DK 909166 T3 EP 0909166 A2 ES 2157566 T3 WO 9741843 A2 JP 2001506227 T PT 909166 T	15-04-2001 04-11-1997 03-05-2001 15-11-2001 13-08-2001 21-04-1999 16-08-2001 13-11-1997 15-05-2001 28-09-2001
US 5824291	A	20-10-1998	NONE	
US 5711961	A	27-01-1998	IT 1274034 B EP 0769935 A1 CH 689249 A5 WO 9603111 A1	14-07-1997 02-05-1997 15-01-1999 08-02-1996
US 4753805	A	28-06-1988	AU 3668684 A CA 1240875 A1 EP 0151344 A2 ES 538521 D0 ES 8608288 A1 JP 60164438 A ZA 8409689 A	08-08-1985 23-08-1988 14-08-1985 16-06-1986 01-12-1986 27-08-1985 31-07-1985
US 4737366	A	12-04-1988	AT 55244 T AU 5356586 A DE 3579170 D1 WO 8603967 A1 EP 0235159 A1 FI 872731 A ,B, JP 7096496 B JP 62501419 T	15-08-1990 29-07-1986 13-09-1990 17-07-1986 09-09-1987 18-06-1987 18-10-1995 11-06-1987
WO 9721424	A	19-06-1997	AU 1191497 A WO 9721424 A1	03-07-1997 19-06-1997
JP 07067541	A	14-03-1995	JP 2558437 B2	27-11-1996
EP 0399479	A	28-11-1990	AT 92754 T DE 59002265 D1	15-08-1993 16-09-1993

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 02/03064

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0399479	A	EP 0399479 A1	28-11-1990
		ES 2018452 T3	16-11-1994
EP 0298922	A 11-01-1989	CA 1312769 A1	19-01-1993
		AU 615659 B2	10-10-1991
		AU 1844188 A	12-01-1989
		DE 3880384 D1	27-05-1993
		DE 3880384 T2	21-10-1993
		EP 0298922 A2	11-01-1989
		ES 2040891 T3	01-11-1993
		JP 1034248 A	03-02-1989
		ZA 8804317 A	29-03-1989
EP 0151344	A 14-08-1985	AU 3668684 A	08-08-1985
		CA 1240875 A1	23-08-1988
		EP 0151344 A2	14-08-1985
		ES 538521 D0	16-06-1986
		ES 8608288 A1	01-12-1986
		JP 60164438 A	27-08-1985
		US 4753805 A	28-06-1988
		ZA 8409689 A	31-07-1985